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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/033,114	10/22/2001	Tai-Peng Lee	M-11912 US	7687

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EXAMINER	
GARCIA, JOANNIE A	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 04/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SM

Office Action Summary	Application No.	Applicant(s)	
	10/033,114	LEE ET AL.	
	Examiner	Art Unit	
	Joannie A. García	2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 January 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-58* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *11 and 46-52* is/are allowed.

6)☒ Claim(s) *1-10,12-42,45 and 53-55* is/are rejected.

7)☒ Claim(s) *43,44 and 56-58* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 8-10, 12-16, 19, 20, 23-25, 28-30, 33-36, 39-41, 45, and 53-55, are rejected under 35 U.S.C. 102(e) as being anticipated by Vassiliev et al (U.S. Patent 6,583,069).

Vassiliev et al discloses depositing silicon dioxide into trenches defined in a semiconductor substrate over an electrically metal layer used as an interconnect, where at least two of the trenches are of different aspect ratio (Abstract, and Figure 4B), said depositing method comprising using oxygen and silane gases to reactively form, deposit, and resputter silicon dioxide in substrate 101 by a HDP-CVD process for deposition into at least two trenches of different aspect ratios and widths, wherein a first trench is at least twice as wide a second of the trenches (Figure 4B, Column 1, lines 37-52, and Column 2, lines 21-34, and 53-57), using ions to sputter etch a portion of the formed silicon dioxide during the deposition so as to fill the trenches with the formed silicon dioxide without creating voids of substantial size during said filling of said trenches, wherein the ions include helium (Figure 4B, and Table 1), controlling the etch and deposition of the silicon dioxide such that a nonzero etch to deposition ratio of about 0.07 or less, such as a range between 0.03 to 0.3, is established during the filling of said different trenches (Table 1), using an oxygen to silane ratio of 1.3 or less (Abstract), using a total gas flow of the oxygen, the silane, and an inert gas of 625 sccm, 500 sccm, or less (Table 1), and doping the silicon dioxide during deposition (Column 1, lines 15-35).

Claims 6, 7, 17, 18, 21, 22, 26, 27, 31, 32, 37, 38, and 42, are rejected under 35 U.S.C. 103(a) as being unpatentable over Vassiliev et al as applied to claims 1-5, 8-10, 12-16, 19, 20, 23-25, 28-30, 33-36, 39-41, 45, and 53-55, above, and further in view of the following comments.

Vassiliev et al discloses the claimed invention except using a high frequency bias signal power of 2000 Watts, 1500 Watts, or less, a width of a first trench of said trenches is in the range of 1800 to 3300 Angstroms, and a width of a second of said trenches is in the range of 6600 to 8800 Angstroms. It would have been obvious to one having ordinary skill in the art at the time the invention was made to determine a suitable power, and widths, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller,* 105 USPQ 233.

In addition, the selection of a suitable power, and widths, is obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)(claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and In re Aller, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges

within prior art general conditions is obvious).

Note that the specification contains no disclosure of either the critical nature of the claimed power, and widths, or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen powers, and widths, or upon another variable recited in a claim, the Applicant must show that the chosen powers, and widths, are critical. *In re Woodruf*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claims 43, 44, 46-52, and 56-58, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 11, is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joannie García whose telephone number is (571) 272-1861. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

George Fourson
Primary Examiner
Art Unit 2823

JAG
March 31, 2005

GFourson
Primary Examiner